FEDERAL TRANSIT ADMINISTRATION

PROJECT MANAGEMENT OVERSIGHT PROGRAM

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CLIN 0005: Spot Report
Project Estimate Review

Grantee: City and County of Honolulu

Honolulu High-Capacity Transit Corridor Project

Project Estimate Review
May 14, 2009
DRAFT

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LIST OF ACRONYMS

AA	Alternatives Analysis
Booz Allen	Booz Allen Hamilton
CDT	Contract Document Transmittal
DB	Design-Build
DEIS	Draft Environmental Impact Statement
DTS	City and County of Honolulu Department of Transportation Services
EIS	Environmental Impact Statement
FD	Final Design
FEIS	Final Environmental Impact Statement
FFGA	Full Funding Grant Agreement
FTA	Federal Transit Administration
GEC	General Engineering Consultant
GET	State of Hawai`i General Excise and Use Tax
HHCTC	Honolulu High-Capacity Transit Corridor (Project)
HDOT	State of Hawai`i Department of Transportation
LPA	Locally Preferred Alternative
MOS	Minimum Operating Segment
NEPA	National Environmental Policy Act
NTP	Notice to Proceed
PB	PB Americas, Inc.
PDP	Project Development Plan
PE	Preliminary Engineering
PMO	Project Management Oversight
PMOC	Project Management Oversight Contractor
PMP	Project Management Plan
PMSC	Project Management Support Consultant
QA/QC	Quality Assurance/Quality Control
QMP	Quality Management Plan
ROD	Record of Decision
RTD	DTS Rapid Transit Division
SCC	Standard Cost Category
UH	University of Hawai`i
YOE	Year of Expenditure

1. Executive Summary

Booz Allen Hamilton (Booz Allen), as a Project Management Oversight Contractor (PMOC) under contract with the Federal Transit Administration (FTA), reviewed and assessed the Project Estimate for the Honolulu High-Capacity Transit Corridor (HHCTC) Project submitted by the City and County of Honolulu (City) as of March 28, 2009. The March 28, 2009 Project Estimate reflects the change to the Minimum Operating Segment (MOS) from the Salt Lake alignment option to the Airport alignment option.

The objective of the review was to evaluate if the HHCTC cost estimate is mechanically sound and is sufficiently developed at this Phase of the Project.

Overall, it is our professional opinion that the Project Estimate provided on March 28, 2009 is mechanically sound and acceptable as a Project Estimate for this phase of the project.

The current project estimate provided by the City on March 28, 2009 for the Airport Alignment option, excluding finance charges, is $4,284 million in 2nd Quarter 2008 dollars and $5,043 million in Year of Expenditure (YOE) dollars.

Overall, the cost estimate for the HHCTC Project is found to be reasonable at this stage of the project. The provisions for contingencies were found to be adequate and appropriate for a project in the Pre-Preliminary Engineering (PE) phase. Also, the assumed inflation rates used to adjust project costs from 2008 dollars to YOE dollars were found to be trending low and may not be sufficiently conservative, based on recent cost inflation for construction projects nationally and local Honolulu consumer cost inflation.

The estimate's level of detail is commensurate with a project at the Pre-PE phase. The estimate was prepared in accordance with generally accepted estimating principles and practices. Since the project is in the Pre-PE stage, major cost elements and risk items should be reviewed as the design and engineering mature and the construction schedule is refined. Such items include utility relocations, real estate acquisitions and right-of-way (ROW) considerations, environmental remediation, and geotechnical impacts to foundation design and construction. Additionally, finance charges need to be calculated to capture the Total Project Cost (SCC 10 through SCC 100).

Subsequent to providing the March 28, 2009 estimate the City issued an updated Financial Plan and a revised Project Cost Estimate in the Standard Cost Category (SCC) format on May 7, 2009. The Project Cost reflected in each documents differ as shown in Table 1.

Table 1. Project Cost Comparison

	Financial Plan (May 2009)		SCC Worksheet (May 2009)	
	Millions 2009$	**Millions YOE$**	**Millions 2009$**	**Millions YOE$**
Cost Excluding Finance Charges	$4,330	$5,005	$4,268	$4,942
Cost Including Finance Charges		$5,318	$4,462	$5,173

The PMOC will provide an updated Project Cost Estimate Review based on the revised information by May 29, 2009.

2. Project Background/History

The HHCTC Project is a 29-mile, elevated fixed guideway system along O`ahu's south shore between Kapolei and the University of Hawai`i (UH) at Mānoa, including a spur to Waikīkī.

In July 2005, the state legislation authorized a 0.5-percent General Excise and Use Tax (GET) Surcharge as a source of revenue to build the transit corridor project. The GET surcharge went into effect on January 1, 2007 and has an end date of December 31, 2022. An Alternatives Analysis (AA) was initiated in August 2005 and the AA report was presented to the Honolulu City Council in October 2006. Public meetings were held on the AA in November and December 2006, and on December 22, 2006, the City Council selected the fixed guideway alternative as the Locally Preferred Alternative (LPA). In selecting fixed guideway as the LPA, the City Council left some areas of the alignment open, which will be decided upon as the project progresses. These include West Kapolei, Salt Lake Boulevard versus Airport alignment, and the Waikīkī/UH at Mānoa branches. The total LPA alignment is approximately 29 miles long from end to end.

On July 1, 2007, the City created the Rapid Transit Division (RTD) within the Department of Transportation Services (DTS) through enactment of the City's Fiscal Year 2008 Executive Operating Budget and Program. The RTD's responsibilities will include project development, management and implementation. New staff members continue to be added to the City's organization within RTD and through InfraConsult, LLC (IC), the City's Project Management Support Consultant (PMSC). The City has started advertising the positions currently performed by IC.

On August 24, 2007, the City executed a General Engineering Consultant (GEC) contract for $85 million with PB Americas, Inc. (PB) to perform National Environmental Policy Act (NEPA) documentation and PE activities. The City combined the activities needed to support NEPA and to conduct PE into the GEC contract with separate Notices to Proceed (NTPs).

On April 17, 2008, the Mayor directed DTS to move forward with steel-wheel on steel-rail technology. On August 1, 2008, the City issued the Administrative DEIS to FTA for review and comment. The DEIS was completed and issued on October 30, 2008. The DEIS includes three fixed guideway build alternatives:

- Salt Lake only
- Airport only
- Airport and Salt Lake

The City requested entry into PE on May 4, 2009 and anticipates approval from the FTA by July 7, 2009.

In 2006, the City Council identified a 19-mile alignment from East Kapolei, through Salt Lake Boulevard and downtown, and with an eastern terminus at the Ala Moana (Shopping) Center as the selected MOS, which would be built first with the current funding/revenue available. The Project did not include the alignment from West Kapolei to East Kapolei, or from Ala Moana

Center to Waikīkī or to the UH at Mānoa. However, on January 28, 2009 the City Council voted to revise the MOS alignment to the Airport alignment in lieu of the Salt Lake alignment.

The Airport alignment is approximately a 20-mile portion of the 29-mile LPA, extending from East Kapolei to Ala Moana Center via the Airport. The Airport alignment includes 21 stations. The alignment is elevated, except for an at-grade portion of 1,815 linear feet at the Leeward Community College station. The Airport alignment will average a total of 95,310 boardings in the year 2030 and will provide two significant areas with potential for Transit Oriented Development, near the Airport and in surrounding industrial areas.

It is anticipated that the initial fleet size will be 69 vehicles. There is currently no Full Funding Grant Agreement (FFGA) for this project. The Waipahu/Leeward Section will be the first section scheduled to be in operation at the end of 2012.

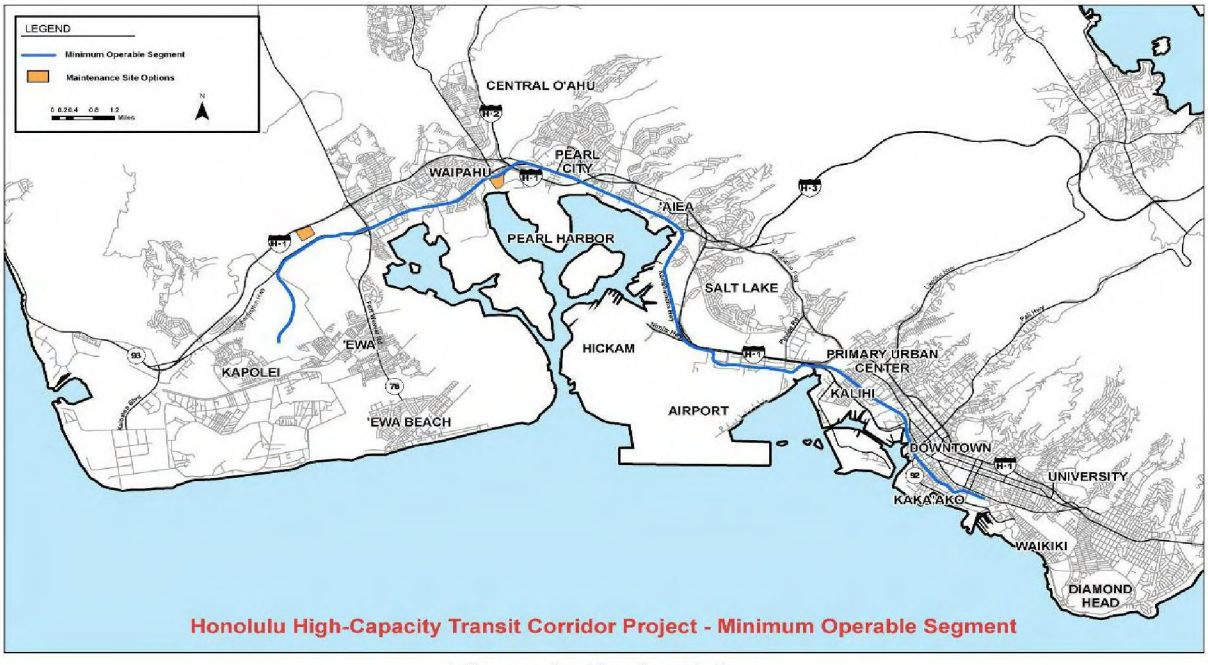

Figure 1. Project Map

3. Methodology

Booz Allen, as a PMOC, performed a preliminary review of the latest cost materials related to the Airport Alignment of the HHCTC Project, submitted by the City as of March 28, 2009. The purpose of the review is to:

- Assess the cost estimate for reasonableness for the project phase
- Determine if the estimate is mechanically sound
- Assess the estimating methodology and approach
- Identify inconsistencies or items in the estimate that may require additional review and/or revision.

The following files, provided by the City, were used by were used by Booz Allen for the cost estimate review:

1. SCC Worksheet: HHCTC Airport Alignment FY 2008 (Main Worksheet – Build Alternative), dated March 27, 2009
2. HHCTC Modified AA Estimate Airport Alignment (Excel Estimate), dated March 27, 2009
3. Basis of Current Airport DEIS Estimate.

Booz Allen also referenced the following documents in its review:

1. HHCTC Design Build (DB) Estimate, prepared by the General Engineering Consultant (GEC), dated October 2, 2008
2. HHCTC Design Bid Build (DBB) Estimate, prepared by the GEC, dated October 2, 2008
3. Subtask 33A: Parametric Project Cost Estimate Review – Section 6 of the HHCTC Spot Report – Final Draft, prepared by Jacobs, December 2008
4. Appendix C of the HHCTC Spot Report – Final Draft, December 2008: SCC Worksheet: Salt Lake Alignment (Main Worksheet – Build Alternative), dated September 11, 2008.

4. Review and Assessment of Project Estimate

Booz Allen notes that the methodology taken to develop the current HHCTCP Airport Alignment estimate is similar to the approach taken to generate the Salt Lake Alignment DEIS estimate.

The methodology for the Airport Alignment estimate[1] is as follows:

- The same estimate and quantities for Segments B, C, D, and E & G were used. (Booz Allen confirmed this through spot checks on the line items and quantities. However, Booz Allen also found that the following line item differs:
  - Segments E & G: Utility Modifications – Electrical & Communication (sub study) - Dillingham-Nimitz-Halekauwila-Kapiolani: $193,469,182 (lump sum) for the Airport Alignment vs. $122,515,433 (lump sum) for the Salt Lake Alignment.
- The estimate for Segment F (Salt Lake Blvd.) was subtracted from the overall estimate. (Booz Allen confirmed that Segment F was not included in the Airport Alignment estimate).
- The estimate for Segment J (Airport) was added to the overall estimate (Booz Allen confirmed this).
- All the pricing for the direct costs was the same (Booz Allen confirmed that the unit pricing and line item pricing for the applicable segments were the same, except as noted above).
- All the indirect (soft costs) were calculated the same way (Booz Allen confirmed that the same percentages were used in both estimates for a particular soft cost).
- All costs for the base estimate are in Q4 CY2007$ (see Booz Allen's observations and discussion under Base Year Costs and Escalation below).

Booz Allen noted the following differences:

- There are 69 light metro rail (heavy rail) vehicles, instead of 60[2], included in the Airport Alignment estimate.
- A factor of 15% has been added to private utility costs for each segment to reflect the decision not to cost-share with those companies. This is consistent with the PMOC's comments made in the previous review process. (The PMOC notes that a 15% allowance was applied to utility modifications with no utility agreements in Segments B, C, J, and E&G. The 15% markup was not applied to utility modifications in Segment D.)
- There is a net reduction in ROW costs in changing from the Salt Lake Alignment to the Airport Alignment due to the fact that the Airport Alignment is primarily on public land with relatively reduced acquisition requirements. (The PMOC notes that ROW costs decreased from $137,662,191 to $131,797,000).

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[1] Taken from "Basis of Current Airport DEIS Estimate"

[2] The "Basis of Current Airport DEIS Estimate" states "65" vehicles, although "60" vehicles are reported in the Salt Lake Alignment SCC Worksheet (Main Worksheet – Build Alternative), dated Sept. 11, 2008.

- There are four stations on the Airport Alignment as opposed to two on the Salt Lake Alignment. One of those stations, the Aloha Stadium Station, has a center and side platform. (However, the PMOC notes that the Aloha Stadium Station is shown only as a "side platform concourse" in the Project Management Plan – Rev. 2, March 1, 2009, Table 2, page 1-6. Thus, there is an inconsistency in platform type/layout for the Aloha Stadium Station.)
- The Airport Alignment is approximately 1.22 miles longer.

Since the Airport Alignment estimate's methodology is basically the same as the Salt Lake Alignment DEIS estimate's methodology (except for the differences noted above) and since the supporting back-up for the Salt Lake Alignment estimate previously provided to the PMOC would apply to the Airport Alignment (except for Segment F), previous observations captured in the Cost Spot Report and Cost Validation Report would also apply. They include, but are not limited to:

- A sampling of the units cost in the Airport Alignment estimate indicated that the unit costs were the same in all segments of the Airport Alignment. Thus, the unit costs do not take into account varying site conditions along the alignment. Similarly, the estimate does not account for unforeseen site, ground, or geotechnical conditions.
- Station costs were based on generic line items and parametrically derived quantities and costs. Thus, the scope needs to be better defined to allow a more accurate portrayal of the station-related costs. This also applies to the four new stations on the Airport Alignment.
- The previous 2006 and current 2008 hazardous materials and environmental mitigation costs were lump sums, with minimum definition of scope. In order to develop a more accurate estimate of these hazmat/environmental costs, Booz Allen recommended in 2007 that a detailed site assessment be performed early in the PE Phase to better quantify the type, limits, and extent of any soil or groundwater contamination.

Booz Allen also previously identified these risks, which are relevant to the current Airport Alignment estimate:

- The availability and retention of labor, as well as the availability of materials and equipment, may adversely impact cost and schedule.
- Geotechnical information is not sufficient. Geotechnical and boring data is needed for the foundation design of structures.
- Real estate acquisitions are not completely known.
- Precast yards and laydown/staging areas need to be identified.
- Traction power supply and distribution requirements are not fully defined.
- Station communications and intelligent transportation systems need better definition.
- Fare collection system and equipment need better definition.

Booz Allen offers the following new and additional observations:

- **Stations – SCC 20**
  The Airport Alignment SCC Worksheet (dated March 27, 2009) shows a total of 21 stations, all aerial (SCC 20.02). However, the Leeward Community College Station is a proposed at-grade or slightly depressed station. This discrepancy was previously noted at the September 2008 Risk Assessment Workshop. It is unclear if the appropriate costs for an at-grade station at the Leeward Community College are now captured in the current Airport Alignment estimate.

- **Base Year Costs and Escalation**
  The HHCTCP Modified AA Estimate Airport Alignment cost estimate (filename: MU Airport Alignment 3-27-09.xls) states that "All costs are in Q1 2007 in the body of the estimate with adjustment to Q4 2007 at the summary level." That adjustment is a 3.65% escalation factor, which brings the total cost of the HHCTP to $4,283,695,200, in 4th Quarter 2007 dollars.

  However, the Main Worksheet – Build Alternative cost estimate (filename: SCC Worksheet Airport Alignment FY 2008 03-27-09 rev.pdf) presents costs for each SCC and the Total Project Cost in 2nd Quarter FY 2008 dollars. The total project cost is shown as $4,283,695,000 in 2nd Quarter FY 2008 dollars.

  Consequently, Booz Allen notes the HHCTP total costs are identical, although 4th Quarter 2007 dollars and 2nd Quarter FY 2008 dollars are used. Thus, it is unclear if the 4th Quarter 2007 dollars are supposed to be (or are actually) 2nd Quarter FY 2008 dollars.

  In Booz Allen's opinion, the 4th Quarter 2007 dollars should be escalated to 2nd Quarter 2008 dollars using an appropriate escalation construction cost index (or an actual inflation rate) over that time period.

- **Finance Charges - SCC 100**
  The Airport Alignment estimates (as shown in the HHCTCP Modified AA Estimate or the Airport Alignment's SCC Worksheet [Main Worksheet – Build Alternative]) do not include Finance Charges (i.e., SCC 100 costs are zero for the Airport Alignment); although the Salt Lake Alignment computed finance charges as $359,651,000 (2nd Quarter FY 2008$) or $484,070,859 (YOE$).

  The PMOC recommends that the Finance Charges for the Airport Alignment be calculated in order to arrive at a Total Project Cost, which includes SCC 10 through SCC 100.

- **YOE Estimate and Outyear Escalation**
  No backup or supporting worksheets were provided to support the calculation of the Airport Alignment's YOE costs, although YOE costs are shown in the Airport Alignment's SCC Worksheet (Main Worksheet – Build Alternative) cost estimate.

Booz Allen notes that the YOE multiplier for the Salt Lake Alignment DEIS estimate and the Airport Alignment are different (see table below), possibly indicating that:

- Different outyear escalation factors were used, or
- The time phasing of the construction activities/costs is different, due to different construction schedules and/or differing years in which the costs are expended, or
- Other factors are in play.

Alignment	2nd Qtr FY 2008 Dollars	YOE Dollars	Multiplier [YOE$/2008$]
Salt Lake	$4,261,366,070	$5,258,434,182	1.234
Airport	$4,283,695,200	$5,043,321,000	1.177

Since it is reasonable to expect that the two alignments will have differing construction schedules and thus, the year in which certain construction costs will be expended will differ between the two alignments, Booz Allen assumes that the differing multipliers (YOE$/2008$) can be attributed to this and/or potentially to other factors.

Booz Allen further assumes that the same escalation methodology and same outyear escalation rates were used in both the Salt Lake and Airport Alignment estimates. If that indeed is the case, Booz Allen believes that the escalation rates in the 2008 Salt Lake Alignment DEIS Estimate[3] are trending low and that the City should re-evaluate the percentages used for escalation to develop the year-of-expenditure costs. The City should consider applying higher escalation rates to the Airport Alignment estimate, especially in the years 2011 through project completion.

Given that construction inflation remains, Booz Allen recognizes that the rate of increase has begun to slow as energy costs and some commodity prices have decreased. Furthermore, Booz Allen believes that construction markets such as Honolulu, with limited contractor pools to work on large, complex, and specialized projects; with a perceived shortage of skilled and unskilled labor; and with few responsible bids anticipated (and a volatile bidding environment), will not completely absorb any material price decreases, if any. In addition, ENR's Construction Cost indices indicate an average escalation of 4.7% for the last five years and 4.0% for the last 15 years. Thus, Booz Allen recommends using more conservative or greater escalation rates in the Airport Alignment YOE estimate, especially in years 2011 through 2019.

[3] The 2008 Salt Lake DEIS Estimate includes the following escalation rates: 4.85% for FY2009; 3.55% for FY2010; 2.90% for FY2011; and 2.80% through FY2019.

- **Total Project Cost Inconsistencies between SCC Worksheet – Airport Alignment (March 27, 2009) vs. Project Management Plan, Rev. 2 (March 1, 2009)**
  Booz Allen notes that the base year costs ($4.284 billion) and the YOE costs ($5.043 billion) presented in the HHCTC Airport Alignment SCC Worksheet (dated March 27, 2009) do not match the base year costs ($4.125 billion) and the YOE costs ($4.929 billion) in the HHCTCP Project Management Plan, Rev. 2, dated March 1, 2009[4]. Both sources exclude finance charges.

[4] HHCTCP Project Management Plan – Rev. 2, March 1, 2009. See Table 12 – Project Estimate, page 3-14.

5. Conclusion

Booz Allen, as a PMOC under contract with the FTA, reviewed and assessed the Project Estimate for the HHCTC Project submitted by the City as of March 28, 2009. The March 28, 2009 Project Estimate reflects the change to the MOS from the Salt Lake alignment option to the Airport alignment option.

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